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(54) **PROVIDING OPTIONS TO LIVE STREAM MULTIMEDIA CONTENT**

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(71) Applicant: **The DIRECTV Group, Inc.**, El Segundo, CA (US)

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See application file for complete search history.

(72) Inventors: **Sudheer Bandela**, Torrance, CA (US);  
**Binny Asarikuniyil**, Cerritos, CA (US);  
**Hai Nguyen**, Torrance, CA (US);  
**Heather Truong**, Anaheim, CA (US)

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(73) Assignee: **The DIRECTV Group, Inc.**, El Segundo, CA (US)

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(Continued)

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*Primary Examiner* — Nasser M Goodarzi

*Assistant Examiner* — Patrick A Ryan

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(74) *Attorney, Agent, or Firm* — Baker Botts, LLP

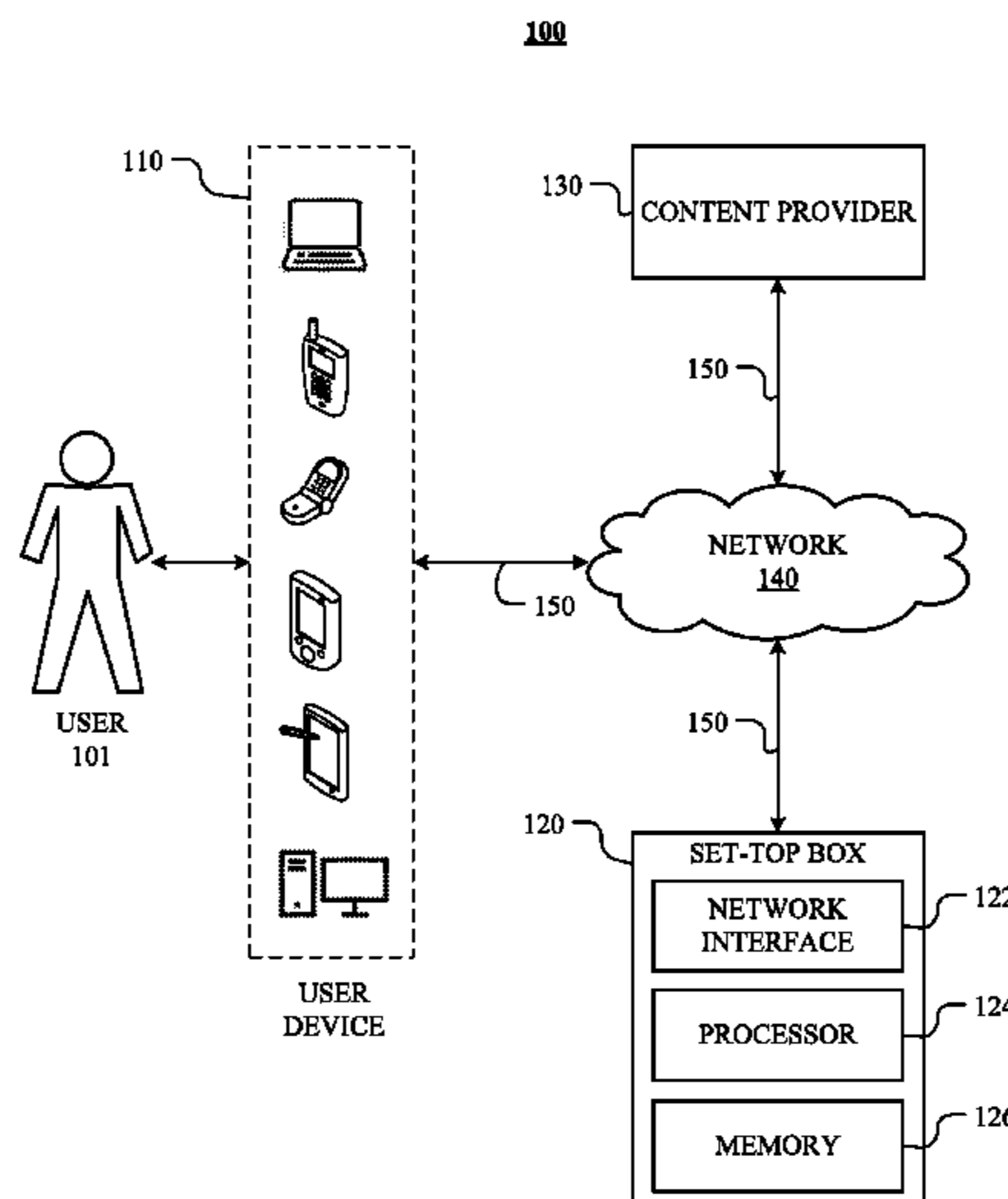
(57) **ABSTRACT**

In one embodiment, a set-top box determines whether to communicate a notification to a user device to live stream multimedia content. The notification comprises an option to initiate live streaming of the multimedia content. The set-top box communicates the notification to the user device to live stream the multimedia content. A user device communicates a selection to initiate live streaming of the multimedia content to the set-top box. In response to the selection, the set-top box live streams the multimedia content to the user device.

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**18 Claims, 4 Drawing Sheets**



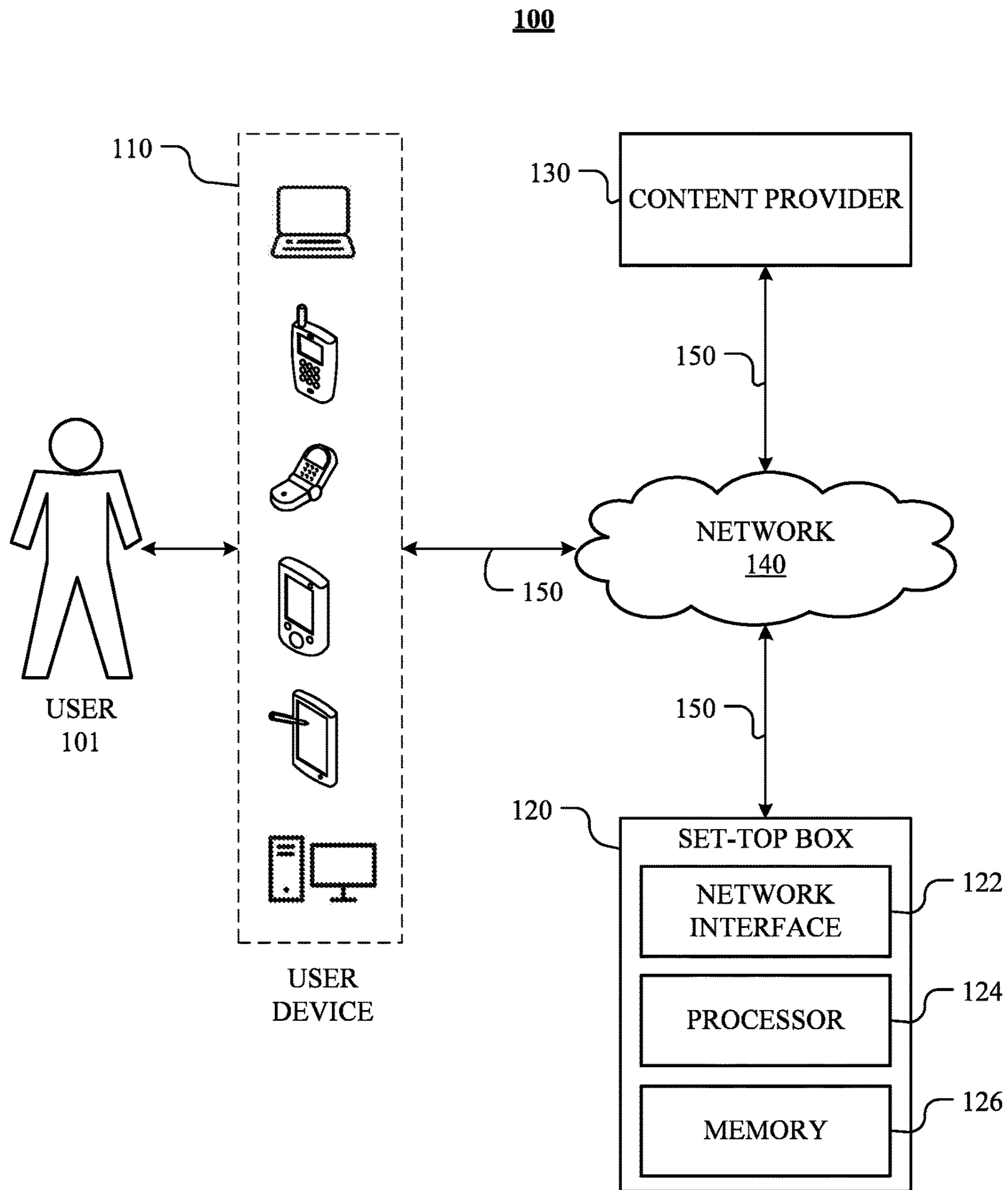
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**FIG. 1**

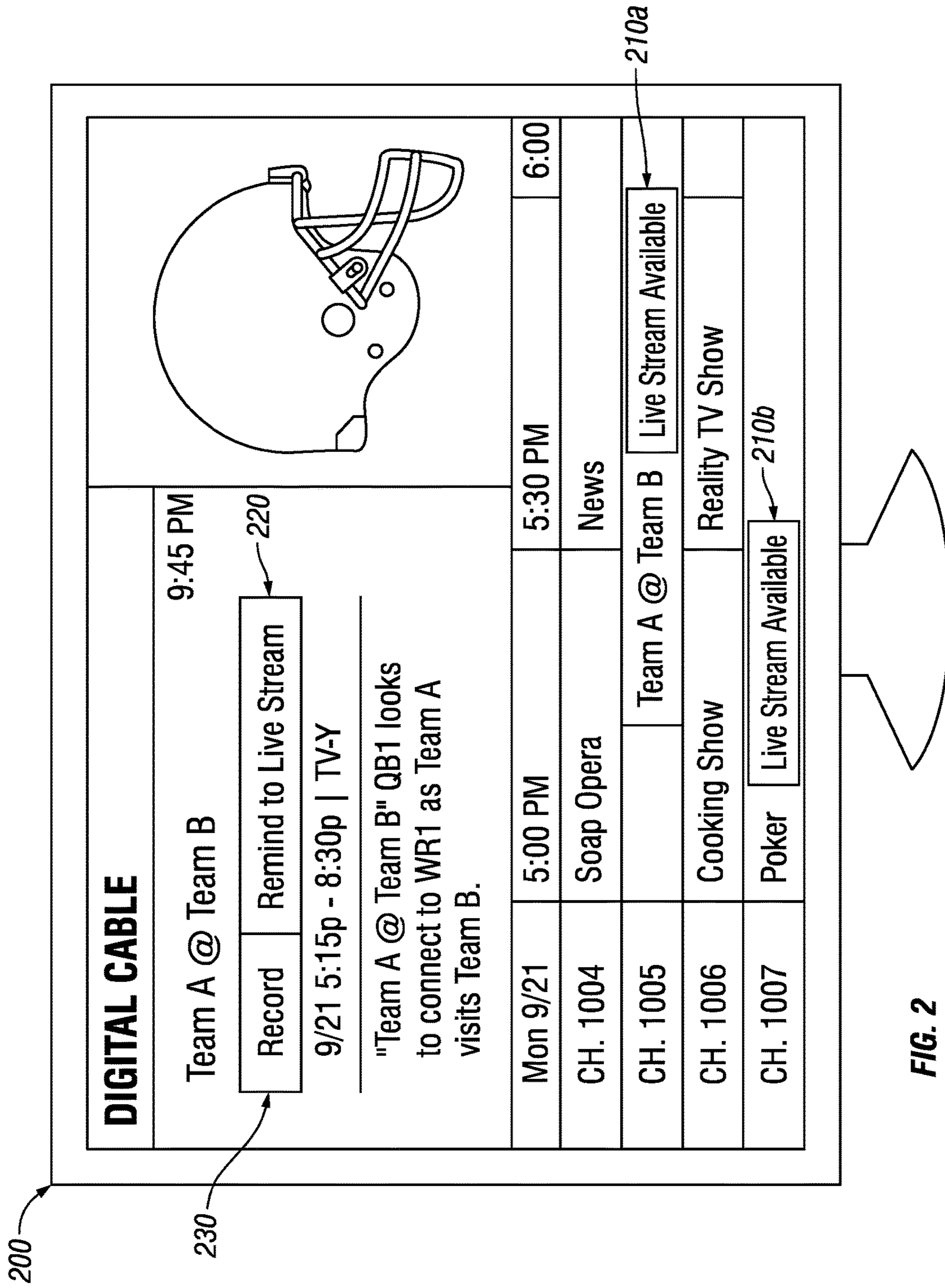


FIG. 2

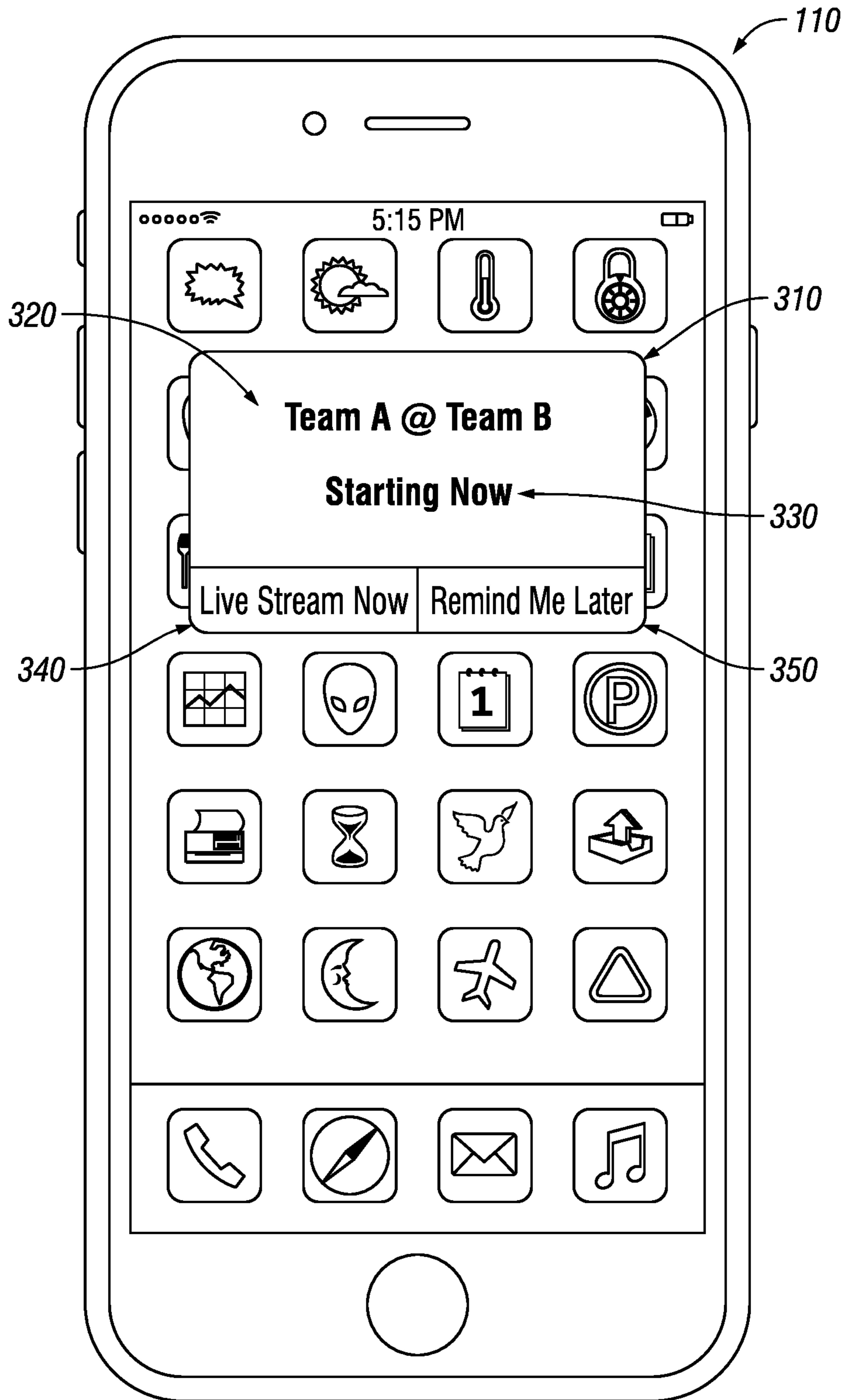


FIG. 3



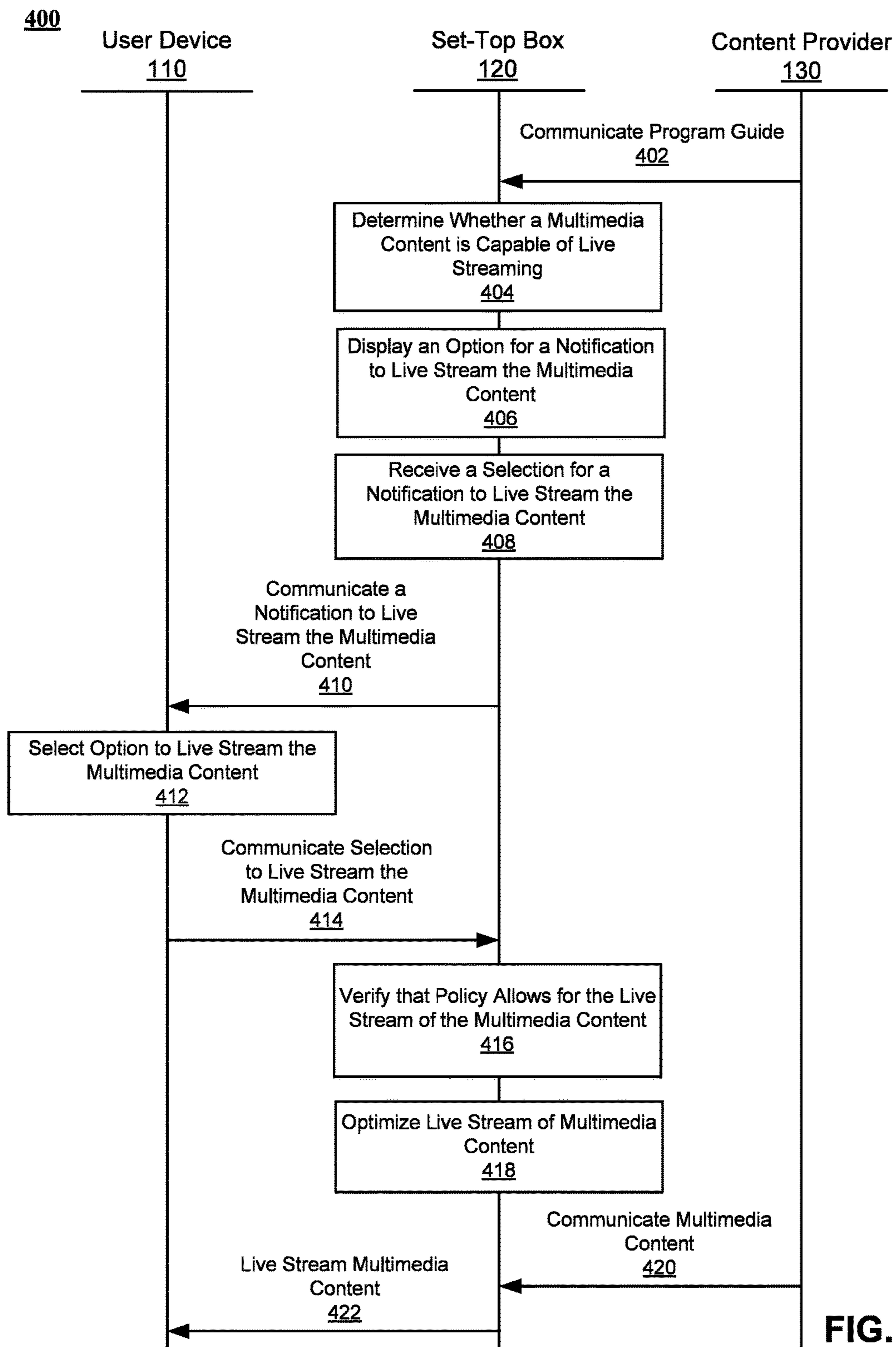


FIG. 4

**1****PROVIDING OPTIONS TO LIVE STREAM  
MULTIMEDIA CONTENT**

## TECHNICAL FIELD

The present disclosure generally relates to streaming multimedia content, and, in particular, to live streaming multimedia content through a set-top box.

## BACKGROUND

Users may view multimedia content through a display attached to a set-top box. Users may navigate a program guide to record multimedia content to watch at a later time. Typically, to record multimedia content, the user selects a recording option associated with the multimedia content. The set-top box, in turn, records the selected multimedia content for the user to view later.

## SUMMARY OF PARTICULAR EMBODIMENTS

According to embodiments of the present disclosure, disadvantages and problems associated with live streaming multimedia content through a set-top box (STB) may be reduced or eliminated.

In one embodiment, a STB determines whether to communicate a notification to a user device to live stream multimedia content. The notification comprises an option to initiate live streaming of the multimedia content. The STB communicates the notification to the user device to live stream the multimedia content. A user device communicates a selection to initiate live streaming of the multimedia content to the STB. In response to the selection, the STB live streams the multimedia content to the user device.

Certain embodiments of the present disclosure may provide one or more technical advantages. Technical advantages of one embodiment include improving the user experience by efficiently identifying the multimedia content that has live streaming capability and by providing a notification to one or more of the user devices at the time that the live streaming of the multimedia content is available. Moreover, technical advantages of one embodiment also include improving the functioning of a set-top box by providing security and authorization for the STB before live streaming multimedia content to the user device and improving network efficiency and throughput by optimizing and adapting the live stream content based on the capability of the user device.

Other technical advantages of the present disclosure will be readily apparent to one skilled in the art from the following figures, descriptions, and claims. Moreover, while specific advantages have been enumerated above, various embodiments may include all, some, or none of the enumerated advantages.

## BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention and for further features and advantages thereof, reference is now made to the following description taken in conjunction with the accompanying drawings, in which:

FIG. 1 illustrates an example network environment associated with live streaming multimedia content;

FIG. 2 illustrates an example program guide displayed by a set-top box;

FIG. 3 illustrates example notification displayed on a user device; and

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FIG. 4 illustrates an exemplary signaling diagram depicting the interaction between a user device, set-top box, and content provider.

## 5 DESCRIPTION OF EXAMPLE EMBODIMENTS

Embodiments of the present disclosure and its advantages are best understood by referring to FIGS. 1-4, like numerals being used for like and corresponding parts of the various drawings.

Users may view multimedia content through a display attached to a set-top box. Users may navigate a program guide to record multimedia content to watch at a later time. Typically, to record multimedia content, the user selects a recording option associated with the multimedia content. The set-top box, in turn, records the selected multimedia content for the user to view later.

Recording multimedia content for the user to later view is problematic, however, because the user may want to view the multimedia content in real time. Exacerbating the issue, users may become distracted, may not have access to a display unit that is directly attached to a STB, and may inadvertently miss the live viewing of the multimedia content. In these situations, the user may prefer to live stream the multimedia content to a user device, and, also, may prefer to be notified of the start of the live stream for the multimedia content.

Providing notifications and real-time multimedia content to a user device may present several technical challenges. To efficiently identify the multimedia content that has live streaming capability, the STB may communicate with the content provider to determine whether a specific multimedia content is capable of live streaming. Moreover, to improve the user experience, the STB may provide a notification to one or more of the user devices that live streaming of the multimedia content is available. Furthermore, to improve the security and privacy of live streaming multimedia content, the STB may determine whether one or more of the user devices has authorization and/or permission to live stream the multimedia content. In addition, the STB may optimize and adapt the live streaming of the multimedia content based on the receiving user device. For example, the STB may stream the multimedia content in a certain aspect ratio or resolution based on the capability of the user device. Furthermore, the STB may simultaneously record the multimedia content while live streaming the multimedia content to the user device.

FIG. 1 illustrates an example network environment 100 associated with live streaming multimedia content. Network environment 100 includes a user 101, a user device 110, STB 120, and content provider 130 connected to each other by a network 140. Although FIG. 1 illustrates a particular arrangement of user 101, user device 110, STB 120, content provider 130, and network 140, this disclosure contemplates any suitable arrangement of user 101, user device 110, STB 120, content provider 130, and network 140. As an example and not by way of limitation, two or more of user devices 110, STB 120, and content provider 130 may be connected to each other directly, bypassing network 140. As another example, two or more of user device 110, STB 120, and content provider 130 may be physically or logically collocated with each other in whole or in part. Moreover, although FIG. 1 illustrates a particular number of users 101, user device 110, STB 120, content provider 130, and networks 140, this disclosure contemplates any suitable number of users 101, user device 110, STB 120, content provider 130, and network 140. As an example and not by way of



limitation, network environment **100** may include multiple users **101**, user devices **110**, STBs **120**, content providers **130**, and networks **140**.

In particular embodiments, user **101** may be an individual (human user), an entity (e.g., an enterprise, business, or third-party application), or a group (e.g., of individuals or entities) that interacts or communicates with STB **120** and/or content provider **130** through user device **110**. User **101** may navigate a program guide, select multimedia content to record, and perform other interactive functions for viewing multimedia content using STB **120**.

User device **110** may access STB **120** or content provider **130** directly, via network **140**, or via a third-party system. As an example and not by way of limitation, user device **110** may access content provider **130** via STB **120**. In certain embodiments, user **101** must log in and authenticate a user identification and/or password before user device **110** is able to access and communicate with STB **120**. User device **110** may be any suitable computing device, such as, for example, a personal computer, a laptop computer, a cellular telephone, a smartphone, a tablet computer, or an augmented/virtual reality device. User device **101** may also include a user interface, such as a keypad, a display, a microphone, or other appropriate terminal equipment for use by user **101**. In some embodiments, an application executed by user device **110** may perform the functions described herein. User device **110** may be implemented using any suitable type of processing system and may include any suitable combination of hardware, firmware, and software. Each user device **110** may include any appropriate number of input devices, output devices, mass storage media, processors, memory, or other suitable components for receiving, processing, storing, and communicating data.

STB **120** is generally a device that provides interactive features such that user **101** can access, record, and interact with options providing for multimedia content. In particular embodiments, STB **120** may be a network-addressable computing system that can receive input, generate audio and/or video output for display, and communicate with user device **110**. STB **120** may also receive input from content provider **130** and communicate audio and/or video output for display. For example, STB **120** may receive radio frequency analog television input, digital television input, satellite television input, and/or any other suitable type of input that contains a program guide. STB **120** may also receive the program guide from content provider **130**.

The program guide may be an application that provides a list of current and scheduled programs that is or will be available on each channel, and, sometimes, a short summary or commentary for each program. Typically, a program guide allows user **101**, through an interactive diagram, to access television, radio, and other multimedia content with updated menus displaying broadcast programming or scheduling information for current and upcoming programming. In certain embodiments, program guide may also provide a list of current and scheduled programs that are capable of live streaming. STB **120** may comprise a channel device, an ultra-high frequency (UHF) converter, a cable converter box, a closed captioning box, a digital television adapter, an integrated receiver/decoder, a hybrid box, an Internet Protocol Television (IPTV) receiver, and/or any other suitable device that receives the program guide and live streams multimedia content to user device **110**.

Multimedia content consists of television, radio, images, videos, audio, or any other items that may be streamed from one device to another. Multimedia content may be communicated in typical video and/or audio format or may be sent

as a compressed form. In certain embodiments, multimedia content is associated with one or more policies. The associated policies may reside on STB **120** or may be communicated from content server **130**. Policies may include any suitable rating system or filter that may impact what multimedia content is displayed and to whom the multimedia content is displayed.

For example, policies may include parental guidelines. Parental guidelines represent a television content rating system that typically rates multimedia content based on the subject matter of the content and the suitability for certain audiences. For example, a children's program may receive a parental rating of "TV-Y," indicating that multimedia content is designed for a young audience. As another example, a horror show may receive a parental rating of "TV-14-DLS," indicating that the multimedia content may contain material unsuitable for children under the age of 14. Any suitable rating system may be used for the parental guideline.

In the illustrated embodiment, STB **120** includes network interface **122**, processor **124**, and memory **126**. Network interface **122** facilitates communication between processor **124**, network **140**, or other components of network environment **100**. Network interface **122** may facilitate communication over portions of network **140** or over a separate data network. For example, network interface **122** may live stream one or more multimedia contents to one or more user devices **110**. In particular embodiments, network interface **122** includes or represents one or more network interface cards (NICs).

Processor **124** may represent or include any form of processing components, including dedicated microprocessors, general-purpose computers, or other devices capable of processing electronic information. Examples of processor **124** include field-programmable gate arrays (FPGAs), programmable microprocessors, digital signal processors (DSPs), application-specific integrated circuits (ASICs), and any other suitable specific- or general-purpose processors. For example, processor **124** may determine whether user **101** and/or user device **110** are permitted and allowed to live stream a particular multimedia content. As another example, processor **124** may determine which multimedia content is capable of being live streamed. Although FIG. 1 illustrates, for the sake of simplicity, an embodiment of STB **120** that includes a single processor **124**, STB **120** may include any number of processors **124** configured to interoperate in any appropriate manner.

Memory **126** stores processor instructions and/or any other data utilized by STB **120** during operation. Memory **126** may comprise any collection and arrangement of volatile or non-volatile, local or remote devices suitable for storing data, such as random access memory (RAM), read only memory (ROM), magnetic storage, optical storage, or any other suitable type of data storage components. For example, memory **126** may store an authorization policy setting and an authorized user group setting associated with one or more users **101** and/or one or more user devices **110**. Although shown as a single element in FIG. 1, memory **126** may include one or more physical components local to or remote from STB **120**.

Content provider **130** generally communicates the program guide and multimedia content to STB **120**. For example, content provider **130** may communicate multimedia content to STB **120** via network **140**. In some embodiments, content provider **130** communicates multimedia content directly to STB **120**. In some embodiments, content provider **130** may communicate multimedia content to STB



**120** via radio frequency signals transmitted through coaxial cables. Content provider **130** may also communicate the program guide to STB **120**. In certain embodiments, content provider **130** may communicate the live streaming capability of each multimedia content with the program guide. Content provider **130** may communicate the program guide and/or multimedia content via light pulses through fiber-optic cables, over the air radio waves, through network **140** (e.g., through the internet or telephone network), or any other suitable means of transmission. In certain embodiments, content provider **130** identifies the multimedia content that is available for live streaming to STB **120**.

This disclosure contemplates any suitable network **140**. As an example and not by way of limitation, one or more portions of network **140** may include an ad hoc network, an intranet, an extranet, a virtual private network (VPN), a local area network (LAN), a wireless LAN (WLAN), a wide area network (WAN), a wireless WAN (WWAN), a metropolitan area network (MAN), a portion of the Internet, a portion of the Public Switched Telephone Network (PSTN), a cellular telephone network, or a combination of two or more of these. Network **140** may include one or more networks **140**.

Links **150** may connect user device **110**, STB **120**, and content provider **130** to communication network **140** or to each other. This disclosure contemplates any suitable links **150**. In particular embodiments, one or more links **150** include one or more wireline (such as for example Digital Subscriber Line (DSL) or Data Over Cable Service Interface Specification (DOCSIS)), wireless (such as for example Wi-Fi or Worldwide Interoperability for Microwave Access (WiMAX)), or optical (such as for example Synchronous Optical Network (SONET) or Synchronous Digital Hierarchy (SDH)) links. In particular embodiments, one or more links **150** each include an ad hoc network, an intranet, an extranet, a VPN, a LAN, a WLAN, a WAN, a WWAN, a MAN, a portion of the Internet, a portion of the PSTN, a cellular technology-based network, a satellite communications technology-based network, another link **150**, or a combination of two or more such links **150**. Links **150** need not necessarily be the same throughout network environment **100**. One or more first links **150** may differ in one or more respects from one or more second links **150**.

In an exemplary embodiment of operation, STB **120** displays a program guide to user **101**. In certain embodiments, STB **120** may also indicate whether a certain multimedia content is capable of live streaming. STB **120** may communicate with content provider **130** to determine whether a certain multimedia content is capable of live streaming. For example, STB **120** may communicate a query to content provider **130** requesting the live streaming capability for one or more multimedia content, and, in response, content provider **130** may communicate the live streaming capability for the requested one or more multimedia content. In alternative embodiments, content provider **130** may communicate the program guide to STB **120**, wherein the program guide contains information comprising whether multimedia content is capable of live streaming. In addition, STB **120** may communicate a notification to live stream the multimedia content. The STB **120**, in certain embodiments, may first communicate an option for a user to receive a notification to live stream the multimedia content. This option for a notification may be displayed on user device **110**, displayed in the program guide for user **101** to select, or as a default notification that user **101** selects to record the multimedia content. In certain embodiments, the option for a notification may be available in a separate program guide that illustrates multimedia content capable of live streaming.

In this example, STB **120** communicates the notification to user device **110** to live stream the multimedia comment. STB **120** may communicate the notification as an e-mail, a text message (e.g., short message server), a push notification, or any other type of notification that alerts user **101** of an upcoming live streaming of multimedia content on user device **110**. The timing of the notification may vary. For example, the notification may occur before a pre-determined amount of time before live streaming of multimedia content begins. User **101** may establish the timing to send the notification, or STB **107** may communicate the notification a set time before beginning to live stream the multimedia content. Moreover, in certain embodiments, STB **120** may communicate multiple notifications to user **101** over various user devices **110**. For example, STB **120** may communicate one or more push notifications to user **101** over a mobile device in user device **110** and also communicate an e-mail notification to a laptop in user device **110**. The notification may comprise an option to initiate live streaming of the multimedia content. In certain embodiments, the option to live stream the multimedia content may comprise live streaming the multimedia content in the future. In certain embodiments, the notification contains a uniform resource locator that directs user **101** to access a web address containing the live stream of the multimedia content.

In certain embodiments, STB **120** may communicate a notification to user **101** to live stream multimedia content based on an analysis of the user **101** viewing history or indicated preferences. STB **120** may analyze the viewing history (e.g., recorded programs, live streamed programs, genre of programs, actors/actresses of programs) to determine multimedia content that may interest user **101**. For example, STB **120** may analyze the viewing history of user **101** to determine that user **101** watches sports games involving Team A. STB **120** may then identify the next multimedia content (e.g., Team A football match), and communicate a notification to user **101** to live stream the next multimedia content that relates to Team A. User **101** may also set preferences for multimedia content for which user device **110** should receive a notification. For example, user **101** may indicate that his or her favorite team is Team A and that the preferred user device is the mobile device of user **101**. STB **120** may then communicate a notification to the mobile device of user **101** to live stream all multimedia content that relates to Team A.

User **101** may select to initiate live streaming of the multimedia content on user device **110**. In this example, user device **110** communicates to STB **120** to initiate live streaming of the multimedia content. In certain embodiments, user device **110** may communicate to STB **120** to initiate live streaming of the multimedia content at a later time. Alternatively, user device **110** may communicate to STB **120** to initiate live streaming of the multimedia content immediately. User **101** may also indicate to STB **120** to communicate a reminder to user device **110** at a later time (e.g., by a set time before, during, or after multimedia content begins).

In response to the selection by user **101** to initiate live streaming of the multimedia content, STB **120** may live stream immediately, or at a later time, multimedia content to one or more user devices **110**. Live streaming is a term used to describe the process of broadcasting multimedia content to user device **110** in real time. Typically, a live stream of multimedia content is constantly being delivered from STB **120** to user device **101**. Rather than user device **101** downloading a portion of the multimedia content first, user device **101** displays the multimedia content as soon as it is received. STB **120** may utilize the Internet to live stream the multi-



media content to user **101**. In certain embodiments, STB **120** may simultaneously live stream the multimedia content to user device **110** and also record the multimedia content in memory **126**. When the recording option is implemented, user **101** may rewind or pause multimedia content on user device **110** during the live stream. Moreover, user **101** may also view the multimedia content after the live stream ends.

In certain embodiments, STB **120** may communicate a second notification to user device **110** to live stream second multimedia content. Similar to the first notification to user device **110**, the second notification may comprise an option to initiate live streaming of a second multimedia content. While live streaming the first multimedia content to user device **110**, user device **110** may communicate a selection to initiate live streaming of the second multimedia content. In response to the selection to initiate live streaming of the second multimedia content, STB **120** may live stream the second multimedia content to user device **110** while simultaneously live streaming the first multimedia content to user device **110**. In certain embodiments, STB **120** will communicate the first multimedia content and second multimedia content in the same stream to user device **110**. In alternative embodiments, STB **120** may interleave streams of the first multimedia content with the second multimedia content. In addition, users **101** may rewind or pause either first multimedia content or second multimedia content if the multimedia content is also being recorded.

STB **120** may also support an authorization model. In certain embodiments, only authorized users **101** and/or authorized user devices **110** may receive live streaming multimedia content. These select users **101** and/or select user devices **110** may belong to an authorized user group. Similarly, certain users **101** and/or certain user devices **110** may be blocked from live streaming multimedia content. STB **120** may store the authorized user group in memory **126**. In certain embodiments, STB **120** may receive the authorized user group from content server **130**. In certain embodiments, STB **120** determines whether users **101** and/or user device **110** belong to an authorized user group. STB **120** may determine whether user **101** and/or user device **110** belong to an authorized user group when user device **110** accesses STB **120**, before STB displays the program guide to user **101** and/or user device **110**, before STB communicates a notification to user **101**, before STB live streams multimedia content to user **101**, or any other suitable time that STB may determine whether user **101** and/or user device **110** belongs to an authorized user group. In certain embodiments, STB **120** will communicate the notification or live stream the video only when user **101** and/or user device **110** belongs to the authorized user group.

In addition, STB **120** may support a viewing policy model. In certain embodiments, users **101** and/or user devices **110** may be associated with one or more policies to view multimedia content. For example, if parental guidelines are supported by STB **120**, parents may watch “Mature Audiences only” content, while children are blocked from “Mature Audiences only” content. The acceptable parental guidelines or maximum parental guidelines (e.g., maximum parental guide is “General Audience”) are associated with select users **101** and/or select user devices **110**. The viewing policy setting may be stored in STB **120** or content server **130**.

In certain embodiments, STB **120** determines the authorization and/or viewing policies settings associated with user **101** and/or user device **110**. STB **120** may then determine whether multimedia content belongs to the acceptable viewing group associated with user **101** and/or user device **110**.

If the multimedia content does not belong to the acceptable viewing group, STB **120** may prohibit displaying the multimedia content in the program guide, communicating a notification to user **101**, or any other type of prevention that prohibits user **101** and/or user device **110** from live streaming the multimedia content on user device **110**. On the other hand, STB **120** may communicate a notification and live stream multimedia content to user device **110** only when the parental guideline of the multimedia content belongs to the acceptable viewing group of user **101** and/or user device **110**.

Modifications, additions, or omissions may be made to network environment **100**. For example, user device **110** may include any number of user devices **110**. Furthermore, the components of network environment **100** may be integrated or separated. For example, STB **120** and content provider **130** may be incorporated into a single component.

FIG. **2** illustrates an example program guide **200** displayed by STB **120**. For example, user **101** may navigate program guide **200** to select multimedia content for recording or live streaming multimedia content now or at a later time. In FIG. **2**, live stream availability options **210a-b**, notification option **220**, and record option **230** are examples of graphical representations displayed on program guide **200** to assist user **101** in determining the programming options available for each multimedia content.

Live stream availability options **210a-b** are graphical representations indicating that the corresponding multimedia content has live streaming capability. STB **120** may determine whether each multimedia content has live streaming capability by communicating with content provider **130**. For example, content provider **130** may provide a list of multimedia content that has live streaming capabilities to STB **120**. In the illustrated embodiment, live stream capability option **210a** may illustrate that multimedia content “Team A @ Team B” may be live streamed at 5:15 pm. Similarly, live stream capability option **210b** may illustrate that user **101** may live stream the multimedia content “Poker.”

Notification option **220** provides user **101** the option for STB **120** to communicate a notification to user device **110**. For example, user **101** may select notification option **220** in order to receive a notification on user device **110** that user **101** may live stream multimedia content “Team A @ Team B” on user device **110**.

Record option **230** allows user **101** the option for STB **120** to record the multimedia content. In certain embodiments, STB **120** may record the multimedia content while live streaming the multimedia content simultaneously. Record option **230** in FIG. **3** may provide user **101** the option for STB **120** to record the multimedia content “Team A @ Team B.” Typically, the recorded multimedia content will be stored on memory **126** for later viewing.

FIG. **3** illustrates example notification **310** displayed on user device **110**. Notification **310** may indicate that multimedia content is available to live stream to user device **110** either currently or in the future. While notification **310** is illustrated as a mobile device notification in FIG. **3**, notification **310** may be an e-mail, a text message, or a push notification on user device **110**. Notification **310** may provide user **101** context of the live streaming content, such as program title **320** and start time **330**. Notification **310** may also include various options, such as live stream now option **320** and delay reminder option **330**.

Program title **320** indicates the title of the program associated with notification **310**. For example, program title **320** may indicate the name of a program that user **101** may



live stream. Program title **320** may include an image that indicates the program associated with notification **310**. For example, the image may include one or more cast members of the program or any other suitable image that facilitates identifying the program. In some embodiments, the image may be a video image, such as a live stream of the program.

If user **101** selects the live stream now option **320**, user **101** may receive a live stream of the “Team A @ Team B” multimedia content after STB **120** ensures that user **101** is permitted and/or authorized to live stream the multimedia content. On the other hand, user **101** may select the delay reminder option **330**, which allows user **101** to receive another notification **310** at a later time.

Start time **330** indicates the time the multimedia content is scheduled to begin. For example, start time **330** may display 5:15 p.m., when the multimedia content associated with notification is scheduled to begin at 5:15 p.m. Start time **330** may also indicate that the multimedia content started, is already playing, or is a countdown of the time remaining before the multimedia content is scheduled to start. In this example, the countdown may display a numerical countdown of the time left before the program is scheduled to begin. For example, if a program is scheduled to begin in three minutes, the countdown may state “3:00.” The countdown may tick down every second until the program begins (e.g., 2:59, 2:58, etc.), and may include minutes, seconds, milliseconds, and/or any other suitable measure of time.

FIG. 4 illustrates an exemplary signaling diagram **400** depicting the interaction between user device **110**, STB **120**, and content provider **130**. More than one client system **110**, STB **120**, and/or content provider **130** may exist in the system described herein.

In step **402**, content provider **130** communicates a program guide to STB **120**. In step **404**, STB **120** determines whether multimedia content is capable of live streaming. In certain embodiments, content provider **130** provides an indication of whether certain multimedia content is capable of live streaming. STB **120** can then determine whether the multimedia content is capable of live streaming. In alternate embodiments, STB **120** communicates with content provider **130** after receiving the program guide to determine whether certain multimedia content is capable of live streaming.

In step **406**, STB **120** displays an option to receive a notification to live stream the multimedia content. STB **120** may display the option to receive a notification to live stream the multimedia content on the program guide or on one or more user devices **110**.

In step **408**, STB **120** receives a selection to receive a notification to live stream the multimedia content. In certain embodiments, user **101** selects to receive the notification to live stream the multimedia content by interacting with the program guide. In this embodiment, user **101** may specify which of the user devices **110** will receive the notification to live stream the multimedia content. In an alternative embodiment, user **101** selects to receive a notification to live stream the multimedia content through user device **110**. In this embodiment, STB **120** may determine which user device **110** to communicate the notification to live stream to and/or may communicate the reminder notification to the user device **110** that selected the option.

At step **410**, STB **120** may then communicate a notification to user device **110** to live stream the multimedia content. STB **120** may communicate the notification as an e-mail, a text message, or a push notification on user device **110**. The timing of the notification may vary. The notification may occur before, during, or after the availability to live

stream multimedia content. Moreover, in certain embodiments, STB **120** may communicate multiple notifications to user **101** over various user devices **110**. For example, STB **120** may communicate one or more push notifications to user **101** over a mobile device and also communicate an e-mail notification to a laptop. The notification may comprise an option to initiate live streaming of the multimedia content. The option to initiate live streaming of the multimedia content may comprise live streaming the multimedia content upon user **101** selecting to initiate live streaming of the multimedia content.

At step **412**, user **101** may select to initiate live streaming of the multimedia content on user device **110**. At step **414**, user device **110** may then communicate to STB **120** the selection to initiate live streaming of the multimedia content. User **101** may also select to be reminded of imitating the live stream of the multimedia content on user device **110** at a later time.

At step **416**, STB **120** may verify that a policy associated with user **101** and/or user device **110** allows for the live stream of the multimedia content. In certain embodiments, STB **120** may verify that the user is authorized and permitted to live stream the multimedia content. STB **120** may determine whether user **101** and/or user device **110** is authorized to live stream the multimedia content, and, only upon authorization, may STB **120** live stream the multimedia content. Similarly, in certain embodiments, only permitted users **101** and/or permitted user devices **110** may receive live streaming content. STB **120** may determine whether a policy associated with the multimedia content, such as a parental guideline, belongs to the acceptable viewing group for user **101** and/or user device **110**.

At step **418**, STB **120** may optimize the live stream of the multimedia content for user device **110**. STB **120** may adapt the live stream of the multimedia content based on user device **110**. STB **120** may adapt the resolution, aspect ratio, brightness, frame rate, or any other options that may affect the size or quality of the stream based on user device **110**. For example, STB **120** may stream the multimedia content in a certain aspect ratio, resolution, or compression based on the capability of user device **110**.

At step **420**, content provider **130** may communicate the multimedia content to STB **120**. In certain embodiments, content provider **130** communicates only the selected multimedia content to STB **120**. In other embodiments, content provider **130** communicates a broadcast signal to STB **120**, and STB **120** tunes the broadcast signal to the proper signal containing the multimedia content.

At step **422**, STB **120** live streams the multimedia content to user device **110**. STB **120** may utilize network **140** to live stream the multimedia content to user **101**. In certain embodiments, STB **120** may simultaneously live stream the multimedia content to user device **110** and also record the multimedia content in memory **126**.

Modifications, additions, or omissions may be made to method **400** depicted in FIG. 4. Method **400** may include more, fewer, or other steps. For example, STB **120** may not optimize the live stream according to user device **110**. Steps may also be performed in parallel or in any suitable order. While discussed as specific components completing the steps of method **400**, any suitable component of network environment **100** may perform any step of method **400**.

Herein, “or” is inclusive and not exclusive, unless expressly indicated otherwise or indicated otherwise by context. Therefore, herein, “A or B” means “A, B, or both,” unless expressly indicated otherwise or indicated otherwise by context. Moreover, “and” is both joint and several, unless



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expressly indicated otherwise or indicated otherwise by context. Therefore, herein, "A and B" means "A and B, jointly or severally," unless expressly indicated otherwise or indicated otherwise by context.

The scope of this disclosure encompasses all changes, substitutions, variations, alterations, and modifications to the example embodiments described or illustrated herein that a person having ordinary skill in the art would comprehend. The scope of this disclosure is not limited to the example embodiments described or illustrated herein. Moreover, although this disclosure describes and illustrates respective embodiments herein as including particular components, elements, feature, functions, operations, or steps, any of these embodiments may include any combination or permutation of any of the components, elements, features, functions, operations, or steps described or illustrated anywhere herein that a person having ordinary skill in the art would comprehend. Furthermore, reference in the appended claims to an apparatus or system or a component of an apparatus or system being adapted to, arranged to, capable of, configured to, enabled to, operable to, or operative to perform a particular function encompasses that apparatus, system, component, whether or not it or that particular function is activated, turned on, or unlocked, as long as that apparatus, system, or component is so adapted, arranged, capable, configured, enabled, operable, or operative. Additionally, although this disclosure describes or illustrates particular embodiments as providing particular advantages, particular embodiments may provide none, some, or all of these advantages.

What is claimed is:

1. A method, comprising:

determining, by a set-top box, that first multimedia content is capable of live streaming, the determining including:

providing, by the set-top box and to a content provider, a query requesting a live streaming capability of the first multimedia content,

in response to the query requesting the live streaming capability of the first multimedia content, receiving, by the set-top box and from the content provider, the live streaming capability of the first multimedia content that indicates that the first multimedia content is able to be livestreamed;

providing, by the set-top box, for display, a program guide, the program guide including i) a graphical representation of the first multimedia content and ii) a graphical representation indicating a notification option to live stream the first multimedia content;

receiving, by the set-top box, input indicating i) a selection of the notification option to receive a notification to live stream the first multimedia content and ii) a particular user device of a plurality of user devices to receive the notification, the particular user device not directly coupled to the set-top box;

determining, by the set-top box, to communicate the notification to the particular user device to live stream the first multimedia content, wherein the notification comprises an option to initiate live streaming of the first multimedia content;

communicating, by the set-top box, the notification to the particular user device to live stream the first multimedia content;

receiving, from the particular user device, a selection to initiate live streaming of the first multimedia content; and

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in response to the selection to initiate live streaming of the first multimedia content, live streaming, from the set-top box, the first multimedia content to the particular user device.

2. The method of claim 1, wherein live streaming the multimedia content to the particular user device further comprises simultaneously recording the first multimedia content while live streaming the first multimedia content to the particular user device.

3. The method of claim 1, further comprising analyzing a viewing history of a user to determine the first multimedia content to live stream to the particular user device associated with the user.

4. The method of claim 1, further comprising:

communicating, by the set-top box, a second notification to the particular user device to live stream second multimedia content, wherein the second notification comprises an option to initiate live streaming of the second multimedia content;

receiving, from the particular user device, a selection to initiate live streaming of the second multimedia content; and

in response to the selection to initiate live streaming of the second multimedia content, live streaming the second multimedia content to the particular user device, wherein the second multimedia content is live streamed simultaneously with the first multimedia content.

5. The method of claim 1, wherein the particular user device is associated with a policy, and further comprising: determining whether the policy allows for the live streaming of the first multimedia content; and

live streaming from the set-top box, the first multimedia content to the particular user device when the policy allows for the live streaming of the first multimedia content.

6. The method of claim 1, further comprising:

determining whether the particular user device belongs to an authorized user group; and

wherein communicating, by the set-top box, the notification to the particular user device to live stream the first multimedia content occurs when the particular user device belongs to the authorized user group.

7. One or more computer-readable non-transitory storage media embodying software that is operable when executed to:

determine that first multimedia content is capable of live streaming, the determining including:

providing, to a content provider, a query requesting a live streaming capability of the first multimedia content,

in response to the query requesting the live streaming capability of the first multimedia content, receiving, from the content provider, the live streaming capability of the first multimedia content that indicates that the first multimedia content is able to be livestreamed;

provide, by the set-top box, for display, a program guide, the program guide including i) a graphical representation of the first multimedia content and ii) a graphical representation indicating a notification option to live stream the first multimedia content;

receive, by the set-top box, input indicating i) a selection of the notification option to receive a notification to live stream the first multimedia content and ii) a particular user device of a plurality of user devices to receive the notification, the particular user device not directly coupled to the set-top box;



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determine to communicate the notification to the particular user device to live stream the first multimedia content, wherein the notification comprises an option to initiate live streaming of the first multimedia content; communicate the notification to the particular user device to live stream the first multimedia content; receive, from the particular user device, a selection to initiate live streaming of the first multimedia content; and in response to the selection to initiate live streaming of the first multimedia content, live stream the first multimedia content to the user device.

8. The media of claim 7, wherein live streaming the first multimedia content to the particular user device further comprises simultaneously recording the first multimedia content while live streaming the first multimedia content to the particular user device.

9. The media of claim 7, wherein the software is further operable when executed to analyze a viewing history of a user to determine the first multimedia content to live stream to the particular user device associated with the user.

10. The media of claim 7, wherein the software is further operable when executed to:

communicate a second notification to the particular user device to live stream second multimedia content, wherein the second notification comprises an option to initiate live streaming of the second multimedia content;

receive, from the particular user device, a selection to initiate live streaming of the second multimedia content; and

in response to the selection to initiate live streaming of the second multimedia content, live stream the second multimedia content to the particular user device, wherein the second multimedia content is live streamed simultaneously with the first multimedia content.

11. The media of claim 7, wherein the particular user device is associated with a policy, and the software is further operable when executed to:

determine whether the policy allows for the live streaming of the first multimedia content; and

live stream, from the set-top box, the first multimedia content to the particular user device when the policy allows for the live streaming of the first multimedia content.

12. The media of claim 7, wherein the software is further operable when executed to determine whether the particular user device belongs to an authorized user group; and

wherein communicating the notification to the particular user device to live stream the first multimedia content occurs when the particular user device belongs to the authorized user group.

13. A system comprising one or more processors and a memory coupled to the processors comprising instructions executable by the processors, the processors being operable when executing the instructions to:

determine that first multimedia content is capable of live streaming, the determining including:

providing, to a content provider, a query requesting a live streaming capability of the first multimedia content,

in response to the query requesting the live streaming capability of the first multimedia content, receiving, from the content provider, the live streaming capability of the first multimedia content that indicates that the first multimedia content is able to be live-streamed;

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provide, by the set-top box, for display, a program guide, the program guide including i) a graphical representation of the first multimedia content and ii) a graphical representation indicating a notification option to live stream the first multimedia content;

receive, by the set-top box, input indicating i) a selection of the notification option to receive a notification to live stream the first multimedia content and ii) a particular user device of a plurality of user devices to receive the notification, the particular user device not directly coupled to the set-top box;

determine to communicate the notification to the particular user device to live stream first multimedia content, wherein the notification comprises an option to initiate live streaming of the first multimedia content;

communicate the notification to the particular user device to live stream the first multimedia content;

receive, from the particular user device, a selection to initiate live streaming of the first multimedia content; and

in response to the selection to initiate live streaming of the first multimedia content, live stream the first multimedia content to the user device.

14. The system of claim 13, wherein live streaming the first multimedia content to the particular user device further comprises simultaneously recording the first multimedia content while live streaming the first multimedia content to the particular user device.

15. The system of claim 13, wherein the processors are further operable when executing the instructions to analyze a viewing history of a user to determine the first multimedia content to live stream to the particular user device associated with the user.

16. The system of claim 13, wherein the processors are further operable when executing the instructions to:

communicate a second notification to the particular user device to live stream second multimedia content, wherein the second notification comprises an option to initiate live streaming of the second multimedia content;

receive, from the particular user device, a selection to initiate live streaming of the second multimedia content; and

in response to the selection to initiate live streaming of the second multimedia content, live stream the second multimedia content to the particular user device, wherein the second multimedia content is live streamed simultaneously with the first multimedia content.

17. The system of claim 13, wherein the particular user device is associated with a policy, and the processors are further operable when executing the instructions to:

determine whether the policy allows for the live streaming of the first multimedia content; and

live stream from the set-top box, the first multimedia content to the particular user device when the policy allows for the live streaming of the first multimedia content.

18. The system of claim 13, wherein the processors are further operable when executing the instructions to determine whether the particular user device belongs to an authorized user group; and

wherein communicating the notification to the particular user device to live stream the first multimedia content occurs when the particular user device belongs to the authorized user group.